IMU News 110: November 2021

A Bimonthly Email Newsletter from the International Mathematical Union
Editor: Yoshiharu Kohayakawa, University of São Paulo, Brazil
imu-news-editor@mathunion.org

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1. EDITORIAL: THE BRAZILIAN PUBLIC SCHOOLS MATHEMATICS OLYMPIAD, A BRIDGE BETWEEN BASIC EDUCATION AND MATHEMATICAL RESEARCH

On November 6th, the 16th edition of the Brazilian Public Schools Mathematics Olympiad (OBMEP) ended. Despite the uncertainties arising from the pandemic, just under 18 million students from the sixth year of elementary school (children aged eleven) to the third year of high school (teenagers aged 17) participated in the olympiad this year.

Brazil is a nation of contrasts. On the one hand, the country was admitted, in 2018, to the select Group 5 of the International Mathematical Union (IMU), which gathers the main leaders in the world in this area. In addition to Brazil, it includes, in alphabetical order, Canada, China, France, Germany, Israel, Italy, Japan, Russia the United Kingdom and the United States.

On the other hand, according to the Programme for International Student Assessment (PISA) of the Organisation for Economic Co-operation and Development (OECD), Brazilian students perform well below the average of OECD students. In 2018, the score of Brazilian students in mathematics was 384, significantly below the OECD average (489). The same difference is observed in sciences (404, cf. 489) and in reading (413, cf. 487). Performance in mathematics puts Brazilian students behind most other Latin American countries (Chile 417, Uruguay 418, Mexico 409, Costa Rica 402, Colombia 391, Peru 400), and just ahead of Argentina (379).

A more detailed analysis (OECD, 2019) reveals a regional disparity and a large variation by administrative dependency. In 2018, the PISA average score in mathematics in the North East region of the country was 363, in contrast with 401 in the South region. The PISA score in county schools was 314, while it was 374 for state schools, 469 for federal schools, and 473 for private schools. In Brazil there is clearly a relationship between socio-economic status and PISA results (OECD, 2019).

As the OBMEP's problems do not measure knowledge in mathematics, but creativity, abstraction and reasoning skills, the olympiad reveals every year students with talent for the exact sciences. In the year following the olympiad, the 7,475 medal winners receive a grant from the National Council for Scientific and Technological Development (CNPq) to participate in a training program that teaches mathematics through problem solving and encourages students to continue their studies at a university. Many of them thus become the first member of their families to go into higher education.

This is not the only benefit of OBMEP to the teaching of mathematics in the country. With the olympiads, an increasing number of university mathematics professors are involved in basic education, either in the student training programme described above, or in similar programmes for basic education teachers.

In addition, OBMEP has encouraged university professors to write books for basic education, to contribute to the OBMEP Portal, which contains videos, theoretical booklets, exercise books and tests covering all basic mathematics education curriculum, and to help in establishing curriculum itineraries for high schools.

We thus hope to gradually improve the teaching of elementary mathematics in Brazil, supported by the quality of the scientific research in the country.

Claudio Landim
Deputy Director of IMPA and OBMEP's General Supervisor

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2. NEWS FROM THE COMMISSION FOR DEVELOPING COUNTRIES (CDC)

New call of the Project Support Program of the IMU CDC. The IMU CDC invites applications to the new call of the Project Support Program (PSP). This program supports higher education and capacity building projects as well as local initiatives in mathematics and mathematical education, be they international, regional or local initiatives in Developing Countries as defined by IMU for the period 2019–2022. Research projects are not eligible. Projects financed in the past years can be consulted in the website of the program.

- Projects should start between July 1, 2022, and June 30, 2023.
- The maximum amount to be awarded to each application is 10 000 €.
- The deadline for applications is **January 31, 2022**.

For more information, visit this webpage.

New call of the IMU CDC Graduate Assistantships in Developing Countries Program (GRAID). This program provides modest support for emerging research groups, working in a developing country listed in Priority 1 or 2 of the IMU Definition of Developing Country, making it possible for them to fund their most talented students to study full-time and pursue a Master's or PhD degree in mathematics.

We invite applications from teams consisting of a Principal Investigator plus his or her research group and an International Partner by **March 15, 2022**.

The Principal Investigator should be a university professor in mathematics holding a PhD, working at a university or research centre in a developing country listed in Priority 1 or 2 of the IMU Definition of

Developing Country, who is already training mathematics Master's or PhD students and who is part of a research group. The International Partner should be a mathematician working at a university or research centre not based in any of the countries listed in Priority 1 or 2 of the IMU Definition. At the time of application there should be an active and ongoing collaboration between the International Partner and Principal Investigator.

This program is managed by the GRAID Subcommittee and the American Mathematical Society.

For more information please visit this page.

Call for Donations to the GRAID Program. Funding for GRAID is provided by voluntary donations from mathematicians or mathematical institutions worldwide. The IMU CDC acknowledges and encourages donations to GRAID, which can be made via the Friends of IMU website.

Mathematics Library Assistance Scheme for Developing Countries: Call for Donations. The IMU CDC Library Assistance Scheme matches donors of mathematical material with libraries in universities/research institutions in developing countries where there is a need for mathematical research literature.

CDC offers financial support for shipping costs to individual scientists or institutions wishing to donate books in the mathematical sciences to libraries in developing countries. Please note that donors have to arrange the shipment.

Potential donors have to notify IMU of their available donations, which are then (if suitable) listed on the CDC website where libraries can apply. No material is available at the moment, while some libraries in developing countries are on the waiting list to receive books/journals. We encourage donations!

Please visit this webpage for more information.

Olga Gil-Medrano
Secretary for Policy of the CDC

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3. NEWS FROM THE COMMITTEE FOR WOMEN IN MATHEMATICS (CWM)

CWM funding call for 2022. Applications should be sent before 15 December 2021 to applications-for-cwm@mathunion.org for project funding aimed at either:

- Establishing or supporting networks for women in mathematics preferably at the continental or regional level, or
- Organizing research workshops geared towards establishing research networks for women by fostering research collaborations during the event, or
- Other ideas for researching and/or addressing issues encountered by women in mathematics.

For further details please check the CWM funding call for 2022.

CWM Newsletter 6. The CWM Newsletter appears twice a year, in November and May. CWM Newsletter 6 includes an interview with CWM member Josephine Wairimu, News From CWM (CWM 2022 call, information about (WM)²... and much more). Other News and Announcements (Mathematics without Borders, prizes and honours to very successful women mathematicians, meetings, reports etc), and article about initiatives for women in mathematics in Japan written by Makiko Sasada.

To subscribe to the CWM Newsletter, visit this page.

World Meeting for Women in Mathematics 2022. The second World Meeting for Women in Mathematics, (WM)² 2022, will take place in Saint Petersburg, on July 5, 2022, the day preceding ICM 2022. The program features four plenary lectures by distinguished female mathematicians from Russia and nearby countries: Mina Aganagić, Eugenia Malinnikova, Natalia Vladimirovna Maslova and Maryna Sergiivna Viazovska. See more here.

CWM ambassadors virtual meetings. CWM organized virtual regional meetings of its 150 ambassadors by continent, in Europe, Africa, Asia and Oceania, and the Americas. The aim was to discuss various aspects of the gender gap in mathematics, and initiatives taken to reduce it, in order to share best practices. After the successful continental meetings, a virtual general meeting of all CWM ambassadors will take place from 2pm to 5pm CET on 11 February 2022. For more details, visit this webpage.

Marie-Françoise Roy and Carolina Araujo
Chair and Vice-chair of the IMU Committee for Women in Mathematics

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4. THE 2022 ICM NOETHER LECTURER: MARIE-FRANCE VIGNÉRAS

The 2022 ICM Emmy Noether Lecture will be delivered by Marie-France Vignéras, Professor Emeritus of the Institut de Mathématiques de Jussieu, Paris, France.

A native of France, Marie-France Vignéras grew up in Sénégal and subsequently studied at the Université de Bordeaux, where she completed her PhD in 1974 on the arithmetic of quaternion algebras, under the supervision of Jacques Martinet. With stints elsewhere in France, and at research institutes around the world, she has spent most of her career at the Université Paris 7 (now called IMJ at Université de Paris). She was a plenary speaker at the European Congress of Mathematics in 2000 and an invited speaker at the ICM in 2002. She is the recipient of the Médaille Albert Châtelet, the Silver Medal of the CNRS, the Humboldt Prize and the Petit d'Ormoy Prize of the Académie des Sciences de Paris.

Marie-France Vignéras has been a leading number theorist for over four decades. Early career highlights include her 1978 proof of the existence of non-isometric closed hyperbolic surfaces with the same spectrum, as a consequence of her number-theoretic results. This answered negatively the question of Mark Kac, popularly posed as "Can one hear the shape of a drum?", for hyperbolic surfaces. Much of her later work has centered around representation theory in arithmetics, with many deep contributions, from her proof of a mod-l local Langlands correspondence for GL(n) compatible with the complex local Langlands correspondence, to her recent work classifying mod p representations of p-adic reductive groups. Through her work she has had a profound influence on development of the Langlands program and the representation theory of p-adic groups. She has also had a huge influence on the mathematical community,

e.g., through mentoring, where notable PhD students include Jean-Loup Waldspurger and Jean-François Dat.

ICM Emmy Noether Committee

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5. IDM 2022 INTERNATIONAL DAY OF MATHEMATICS

The 2022 IDM Event Map. The <u>2022 IDM</u> Event Map is now online. Anyone planning an IDM celebration in 2022 is invited to make a pre-announcement on the IDM website; details on the planned event can be added later.

IDM classroom activities and larger events. The IDM Governing Board hopes to increase significantly the number of schools celebrating the IDM, either in the classroom, or through a larger event. One way to interpret the <u>2022 IDM theme "Mathematics Unites"</u> is the fact that the whole planet shares the same mathematical language. To illustrate this through a school activity, some <u>proofs without words</u> have been added to the material proposed for <u>classroom activities</u>. The IDM Governing Board needs your help for reaching the schools and school networks of your country: invite them to celebrate and to join the IDM community by registering to the IDM newsletter.

IDM Ambassadors. The IDM Governing Board is looking for IDM Ambassadors in all countries of the world to help increase celebrating the IDM. If you are interested to become an IDM Ambassador, please send a message to <u>info@idm314.org</u>. IDM Ambassadors will be acknowledge on the <u>IDM website</u>.

IDM Newsletter. If you have not yet done so, <u>register to the IDM Newsletter</u> on the IDM website to learn of all announcements.

<u>Christiane Rousseau</u>
Chair of the <u>IDM Governing Board</u>

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6. THE 9TH HEIDELBERG LAUREATE FORUM

The 9th <u>Heidelberg Laureate Forum</u> (HLF) will take place in Heidelberg, Germany, 18 to 23 September 2022. At the HLF, all winners of the Fields Medal, the Abel Prize, the ACM A.M. Turing Award, the Nevanlinna Prize, and the ACM Prize in Computing are invited to attend. In addition, young and talented computer scientists and mathematicians are invited to apply for participation.

The HLF serves as a great platform for interaction between the masters in the fields of mathematics and computer science and young talents. Over the course of the week-long conference, young researchers will be given the exclusive possibility to connect with their scientific role models and find out how the laureates made it to the top of their fields.

Applications for participation at the 9th HLF are open in three categories: Undergraduate/Pre-Master, Graduate PhD, and PostDocs. Young researchers are encouraged to submit their applications by 11 February 2022 (midnight CET).

To apply, visit [this webpage](#).

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7. MATHEMATICS WITHOUT BORDERS: THE CENTENNIAL OF THE IMU

The IMU celebrated its centennial in Strasbourg with the conference [Mathematics without Borders](#). The IMU was officially founded on 20 September 1920 in Strasbourg, just prior to the ICM being held there. The conference took place in the same building used for the ICM 1920.

Videos of the conference and individual sessions are available on the Université de Strasbourg's [web-channel](#). Besides technical talks by several outstanding mathematicians, the programme included talks such as "News from the ICM 2022", by Stanislav Smirnov, "Capacity and networking project (CANP): a key issue of the [International Commission on Mathematical Instruction](#) (ICMI) at the turn of the 21st century", by Jean-Luc Dorier, "The Sinuous Road towards Global Mathematics", by Norbert Schappacher, and "The Music of Maths: a recital-conference", by Andreatta Moreno, and the session "Interview/discussion with IMU Presidents".

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8. A FURTHER PUBLIC STATEMENT FROM THE IMU

The IMU has been approached by several groups and individuals regarding the mathematician Azat Miftakhov. The Executive Committee of the IMU has issued [a further public statement](#) regarding the matter.

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9. SUBSCRIBING TO IMU NEWS

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